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ABSTRACT

The Multi-User Simulation Environment (MUSE) software is designed to motivate students across many age levels to engage in reading, writing, problem-solving, and collaborative and creative projects. MUSE software provides a text-based, virtual world on computers connected to a network, allowing synchronous and asynchronous communication among users. In Arizona, Phoenix College and Longview Elementary School have utilized MUSE software to create the Maricopa MUSE (MariMUSE) program, a virtual school designed to serve learners from kindergarten to the adult level and specifically focused on increasing the number of inner-city children moving through the educational pipeline toward a college education. In fall 1993, the college offered two classes through MariMUSE: a computer science class focusing on Internet skills and computer programming in the MUSE and an integrated studies class which did not expect students to develop extensive computer skills. In addition, an initial summer camp to introduce the elementary school children to MariMUSE was developed jointly by school and college faculty. The participating children showed tremendous enthusiasm for the program, developing research skills, creativity, writing skills, and goal setting and decision-making processes beyond teachers' expectations. A discussion of the equipment utilized is included. A description of MariMUSE and a proposal for a science-based MUSE program are appended. (TGI)

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Virtual Space Learning MariMUSE:

Connecting Learners from Kindergarten to 99

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Virtual Space Learning MariMUSE:
Connecting Learner from Kindergarten to 99

Introduction/Purpose

Recent experiences with text-based MUSE (Multi-User Simulation Environment) provide compelling evidence that the MUSE environment is a highly motivating educational environment for learning across many age levels. This new medium motivates students to engage in reading, writing, problem solving, as well as collaborative and creative projects. The collaboration occurs naturally across geographic boundaries from Canada, to Phoenix, AZ, to London and across all ages. College and public school faculty and students join professionals in a virtual, one-room school to learn, to construct, and to explore. This extraordinarily interactive, resource-rich environment offers educators an opportunity to create serious educational reform by implementing new pedagogy and new modes of learning.

Interactions within MUSE are as compelling for young children (8-12 years) from highly at-risk environments as for college students. This cross-age level appeal combined with access via the Internet creates a unique opportunity for colleges and universities to build partnerships with local elementary and high schools using communication technology as the linking medium. This partnership assists the children in attaining new skills, and connects them with college students in such a way they perceive college as a natural continuation of their education.

In the following pages, we describe the MUSE software, the MariMUSE (Maricopa MUSE) virtual school concept, the expansion of the virtual community to include elementary school students, and the technological infrastructure required to support this venture.

Description of the Software/Environment

MUSE is a text-based virtual "world" running on a computer connected to a network. This multi-user environment allows for synchronous and asynchronous communication among users. With Internet connections, people from across the country, indeed, around the world participate in "conversations" with the same transmission speed as that of a telephone. However, these real-time discussions have an interesting twist because of the constructive nature of the environment. Discussions occur virtually in spaces described to suit the users. These "rooms" contain objects that actually "perform" actions. This game-like component contributes significantly to the compelling motivational environment.

The following brief description is extracted from a MUSE manual written by Edward L. Wallace, 'Falryx' (Falryx@dartmouth.edu) and gives a sense of the micro world that is created by the users.

> MUSE takes place in an alternate, virtual reality, where you are 'transported' via your computer into a world of text, where vision and imagination commingle to cover the jobs that normally five senses do. In MUSE you are connected to a 'server' (the MUSE) which has a database full of objects, people, places, etc. Your time in this virtual reality is among this database using your imagination and creativity as the primary tools to understand and enjoy what MUSE offers.
>
> Rooms are 'places' within the virtual reality, relating to actual physical locations. Rooms are very similar to the ones within your home, with four walls and a ceiling, but can also be used to represent the 'outdoors'. In this sense 'rooms' are a very broad category of objects meaning any place on the MUSE which relates to an actual 'physical' location where your character can go. Exits are objects which link rooms to one another. In your home, your exits are doors, stairways, or perhaps even windows. Similarly, in a virtual reality you can have exits which link one room to another, and this exit can represent everything from a large hole, to a door, to a catapult which launches you through the sky to land at your new location.

The MUSE software allows students control of their environment in a learning community where cooperation and sharing are the norm. As Wally Feurzeig (1993) states, "the MUSE microworld permits users to explore and experience events in time, driven in part by

interactive feedback from their actions." Because a MUSE is a networked world, those connected to MUSE can access Internet resources giving faculty and students easy connections to Gopher and WAIS servers. Links also exist to e-mail (Pine). Thus users have access to both synchronous conversations, asynchronous communication, Internet resources, as well as creating and acting upon their environment.

A Virtual School

Phoenix College, in cooperation with Longview Elementary, School is developing a virtual school that brings together learners from kindergarten to age 99. Walters and Swan (1993) describe this concept:

> A virtual school is a shared learning environment accessible internationally via the Internet by learners from kindergarten to 99 years of age. It may be used as an adjunct to classrooms, libraries, and other traditional learning environments or as an alternative learning environment, complete in itself.
>
> A virtual school is unconstrained by considerations of time and space. Learners may attend them 24 hours a day, 365 days a year. Learners need not physically transport themselves to the school locations, as the school has no identifiable physical location. They are, however, mechanically constrained. Learners must have access to a computer terminal and be able to manipulate the computer's keyboard and to read what appears on the screen. Learners must have access to a network link, whether that link is a telephone line and modem or some other connections. Means for overcoming this balancing factor include: increasing size of modem pools, making networked open labs easily available to learners wishing to connect to the virtual school, making network links available in the learners' homes, renting inexpensive computers or terminals to learners, scheduling training sessions at network capable facilities.
>
> A virtual school maximizes interaction and supports learning based on interaction. Currently, bandwidth (the amount of information which may be transmitted over a network) limits both the quantity and quality of interaction. Thus, the environment is currently text-based and addition of graphics and sound will require expansion of bandwidth both through hardware and software enhancements.
>
> A virtual school supports pooling and sharing vast amounts of knowledge. We are in the process of integrating and/or developing tools which identify, locate and retrieve desired knowledge. Information

access is currently somewhat restrained because of issues of knowledge ownership (such as copyright). However, the amount of information available electronically over the Internet is increasing at a rapid rate.

A virtual school supports collaborative and group learning. The challenge of this collaborative spirit is to support positive interpersonal dynamics that emerge via close working relationships. Learners need skills and techniques for interpersonal and group communication.

The virtual school supports learning and cooperation on a global scale. Learners in the community can just as easily interact with a fellow learner from England as they can from one in another building across the college campus. Time zones and sleeping patterns along with the number of learners who have access to the system are the only limiting factors.

The Community

The MUSE is a learning community with learners creating the environment--a truly collaborative environment. Developing a community implies developing a group of people with a shared vision, committed to helping each other, and able to work together to attain common goals. Faculty can no longer focus only on content; process of communication and cooperation become equally important. They cannot choose to focus only on the intellectual development of learners or there is no community.

The Classes

Faculty and staff are at the base of the learning curve. Three faculty are discovering what does and does not work in this environment. For now, class offerings are small, but with time, Phoenix College will expand the curriculum to meet growing needs. In the fall of 1993, the college offered two classes: 1) A computer science class focusing on Internet skills and programming in the MUSE, and 2) an integrated studies class where students were not expected to develop extensive computer skills or attain high levels of programming-like skills.

Class syllabi are in Gopher, assignments are submitted electronically, and students work in virtual, collaborative groups to discuss ideas

and develop projects. Virtual discussions, with students rapidly putting their thoughts and questions into written words, transform typical classroom discussions. Multiple perspectives emerge instantaneously as students press the return key and see their thoughts written across the screen. They are engaged in discussion by the written thoughts of others. Listservs become the asynchronous mode of communication complementing the synchronous exchange and e-mail link between teacher/student and student/student. Faculty and students "own" virtual offices and "enter" virtual classrooms. Faculty create interactive ways to explore class material and guest speakers from across the world join class discussions.

Partnerships for Developing Talent

In addition to being a virtual college, MariMUSE is a partnership between a community college and an elementary school. The program began when Phoenix College, in cooperation with the Phoenix Think Tank, approached Longview Elementary School about a technology program for children. The intent was to link the college with an elementary school to increase the number of inner-city students moving through the educational pipeline toward a college education. The plan included building an on-going program rather than a one-shot experience for the children by using communication technology.

Meaningful learning occurs across age groupings and the more diverse the learning community is in terms of age, beliefs, ethnic origins, and geographic location, the richer the learning environment. The current age groupings in the school, the current boundaries among institutions and levels are artificial. The structure developed from an industrial model. Networked technologies eliminate the need to adhere to artificial breaks in learning communities.

The partnership began over the summer with Camp MariMUSE. Elementary school and college faculty worked hand-in-hand with

college volunteers to introduce children to the environment. Longview Elementary is a K-6 urban grade school in the Phoenix area. It qualifies as a school-wide Chapter One project with between 85-90% of its student body on free or reduced lunch status. The school has a diverse student population of more than 800 children. Poverty and family problems are prevalent in this neighborhood. Longview children are at risk of being lost in the larger system. Although the demographics have changed recently with a higher number of Hispanic students than in previous years, the student body remain multiethnic. In descending order, 38 percent of the students are Hispanic; 34 percent Caucasian; 21 percent Native American; 5 percent African American; 2 percent Asian; and less than 1 percent Pacific Islander.

The children surpassed everyone's expectations. Remarkably, young children were willing to read and write for 3 hours a day. They were having fun learning. On the first day, some of the older children (going into 6th grade) listened to the dog and pony show put on by volunteers and teachers. Students looked at each other with that "Yeah, sure, this will be fun" attitude. By the end of the first day, they were bubbling and not wanting to get off of the system.

Teachers had not anticipated how much the children would WANT to do research. These were children who did not want to open a dictionary. Soon they WANTED to look up words because they cared about being accurate in what they wrote. They WANTED to do research so they could be accurate in what they described. These behaviors boggled the teachers' minds. When asked to describe a particular object, one child replied, "No, I need to do more research so I can be accurate." Teachers were simply not accustomed to these students wanting to do research and CARING whether or not what they did was good. These children took pride in their work and wanted to produce quality products.

The children responded with more creativity than anyone anticipated. Surprisingly, the children proved that although they

often do not perform high on tests, they are very creative. The superintendent visited one day. After reading what the children were writing, she asked what instruction was used to help them with ideas. The teachers had not used any special instructions or prompts. The environment, its interactive nature, and its capacity to let users create and share on many levels empowered the children. Creating came naturally and they had great ideas. MUSE gave them a place to create, to see the results of their work, and to share what they did.

The children began to think about themselves differently. One little girl, was working with a teacher. After a while she said to the teacher, "You don't think I'm stupid, do you?" This environment offered this child a chance to discover she could be successful.

MariMUSE is highly motivating to these young learners. They affect their environment because they set goals and participate in decision-making processes, because they see their competence develop, because they develop a new reference group in the virtual community. These young learners take pride in their work and learning is fun as well as well as challenging.

The Technology Infrastructure

The MUSE server runs on a Unix environment on an Internet-connected host computer. Participants connect to the MUSE server over the Internet (or Local Area Network) from either a desktop computer or another Internet host computer. Depending on the user's workstation and method of connection to the Internet, the user's client program might be running on a Unix or VMS Internet host or on a Macintosh or X-Server workstation.

The MUSE server incorporates the database of all the objects in the virtual world. The server handles all traffic between the MUSE and each connected user. The user's client program allows more than one session to be open concurrently to multiple MUSE servers. Through the use of additional Internet connections, operated by an automated

agent (analogous to the Western Union Telegraph Service), participants in one MUSE world communicate with participants in another. Additional access to general Internet and host services are provided either by the MUSE server or by the user's client. These include access to files, e-mail, Gopher, Telnet, text editors, etc. A MUSE can even include 'Portals' which direct the user's client to open an session to another MUSE.

Because the contents and state of the virtual world are continually being modified by the activities of the participants, the database is periodically written to disk. When the MUSE server restarts, it reads the data base and resumes from where the database was last written out. On active MUSES, such checkpointing may occur as frequently as every 5 minutes. On less active MUSES, the checkpoint interval may be an hour more. Users also have facilities in their clients to upload and download their own material, so that they can make personal backups.

When a participant resigns from a MUSE, his or her personally created objects are either transferred to a new owner or deleted from the database. For this reason, highly interconnected building among multiple users is unwise, lest the departure of one person leave gaps in the remaining portions of the world. Rather each user tends to be responsible for easily detachable sections of the virtual world. To ensure the integrity of collaborate work, group projects are undertaken by having all the objects owned by a common 'Corporate Character,' with permissions extended to all participating individuals to create and edit the objects owned by the group. This mechanism enables MUSE support by private and collaborative building with reasonable security as participants come and go.

The future of the technology will depend on the availability of sufficient network bandwidth and workstation capability for multi-media. We expect that within a few years, Multi-Media Muse will become a realistic option for many users. The intent is to design Multi-Media Muse in a way that remains compatible with text-only

clients, so that audio and image channels supplement the basic text channel, much like illustrations or sound effects added to a basic story told in words.

The Future

Our vision is to empower faculty and students to interact in new ways. With this vision comes an opportunity to blend new teaching and learning philosophies with technology and the global network. The challenge before us is awe inspiring. The potential for shifting our focus to significant learning instead of excellent teaching is before us. We have something to offer the youth of this country. We need to open this opportunity to those less affluent as well as those with access to resources. As learning begins to occur in this environment, interpersonal interactions become meaningful to the students instead of just academic exercise; developing students as competent individuals becomes essential. Just teaching content becomes impossible. To succeed in the the MUSE environment requires the students to have skills in the core areas identified in SCANS. Because much of the learning community is founded on assumption students want to learn, faculty are forced to consider motivational issues as well as content skills. By creating an authentic environment, faculty have to face the holistic nature of "learning in order to do" instead of "learning in order to know" (SCANS, Learning a Living, 1992).

Phoenix College and Longview Elementary School discovered a magical learning environment. Barry Kort and his colleagues at MicroMUSE provided the software shell and technical support to get started. The college is moving forward to develop the virtual school concept and the linking of Longview Elementary extends the project beyond the physical limits of the college campus and beyond the typical age groups so often restrained by institutional boundaries. Excitement and commitment bind the institutions. Faculty and students struggle to learn new ways to integrate networks that will create new educational possibilities. Anecdotal evidence supports the

captivating nature of the environment. Success with Camp MariMUSE and in classes support its potential as a learning environment. Creativity and persistence remain to keep the vision expanding and growing.

References

Feurzerg, W. (Sept 2, 1993). *Personal Communication.*

SCANS (1992). *What Work Requires of Schools.* (Department of Labor). Washington, D.C.:U.S. Government Printing Office.

Walters, J. and Swan, G. (1993). *Proposal for creating a cooperative for the development of a networked virtual school.* Unpublished Manuscript.

MariMUSE:
Text-Based, Virtual Space Learning

The Partnership:

- Emerged from involvement with the Phoenix Think Tank and a common commitment to prepare students for college
- Provides a one-room school environment for college and elementary school faculty, students and professionals to learn, construct and explore
- Excites students K-12 in such a way they perceive college as a natural continuation of their education
- Encourages collaborative/creative projects across all geographic and age boundaries
- Probes the possibilities of educational reform in an interactive, resource-rich climate
- Assesses student skill development for continuous improvement

Description of the Software/Environment:

- A text-based virtual space where you are transported via your computer into a world where vision and imagination commingle
- A multi-user environment connecting people from around the neighborhood, country and world in "conversations" with the same transmission speed as a telephone
- An environment that allows students to take control of their surroundings within a learning community where cooperation and sharing are the norm
- A place where object can "perform" actions
- A world where reading and writing are the keys to communication and learning

The Results

- 1st Annual Camp MariMUSE successful
- Elementary/college faculty, college volunteers and K-6 Longview students worked together in a shared learning environment
- Meaningful learning across age groupings
- Kids excited about reading, writing and research
- Kids caring about themselves and what they are doing

Science MUSE
NSF Proposal
September, 1993

Purpose and Rationale

We propose to develop new networking technology to aid project-based learning in schools that are serious about implementing systemic reform and restructuring science education. Specifically, we propose to develop the Science MUSE, a powerful educational infrastructure for supporting collaborative projects in science and mathematics. The Science MUSE (for Multi-User Simulation Environment) will be a distributed educational modeling environment simultaneously accessible by multiple users over interactive computer network connections. The use of this interactive environment will enable students to meet with each other and with teachers and scientists, on virtual field trips to diverse mathematical and scientific microworlds. It will provide students with a powerful set of tools for designing and building their own projects and a compelling arena for collaboration on joint projects. We propose to foster the systematic integration of this technology in the CoNECT schools we are creating under auspices of the New American Schools Development Corporation (NASDC), as well as in the National Network Testbed schools sponsored by NSF, and Longview Elementary associated with MariMUSE, a current MUSE operated by Phoenix College.

The Science MUSE will provide a client-server distributed educational networking infrastructure and a rich and diverse set of learning tools to support elementary, middle, and high-school students in designing and building science and math projects in a new kind of collaborative-inquiry environment.